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**Promoting the early detection of cancer: A systematic review of community
pharmacy-based education and screening interventions**

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Abstract

Background:

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Given that the burden of cancer is set to increase globally, strategies are needed to improve the early detection of cancer. As such, increasing focus is now placed on promoting the early detection of cancer through education and screening interventions. One healthcare setting that has significant potential in delivering these approaches is the community pharmacy.

Aims:

This study aimed to systematically review the literature to identify and assess the current evidence for the role of community pharmacies in delivering early cancer detection initiatives.

Method:

A systematic literature search of four databases was undertaken (Medline, Embase, CINAHL, PsycINFO) from inception to February 2015 to identify peer-reviewed intervention studies.

Results:

A total of 2772 articles were identified from the search, of which ten were included in the review. The studies focused on a range of different cancers and showed it is feasible to recruit patients to education and screening interventions within a community pharmacy setting. However, the interventions were poorly described in the literature.

Conclusion:

There is significant potential for community pharmacy to deliver education and screening-based interventions to promote the early detection of cancer, but more evidence is needed to ascertain how interventions delivered in this setting impact on ~~the outcome for~~ patient outcomes in terms of survival.

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Key words: early detection, cancer, community pharmacy, screening, intervention.

Introduction

Early detection of cancer significantly improves the probability of a better survival outcome [1]. For example, 5-year survival rates for early stage non-small cell lung cancer (NSCLC) are around 50 times higher compared with late stage disease [2]. Given the ageing population, and that the cancer burden is set to increase globally [3], strategies are needed to improve the early detection of cancer. This challenge is acknowledged by the World Health Organization (WHO) [4], which has adopted a series of strategies to promote early cancer detection. One approach is developing interventions to raise public awareness through education regarding early warning signs of cancer (e.g. a mole that has recently changed), while another relates to cancer screening: typically individuals from healthy populations are tested to identify those who have previously undetected cancer but, as yet, do not exhibit any symptoms.¹

One healthcare setting that potentially has a role in providing both of these early detection approaches is the community pharmacy. Indeed, the WHO has acknowledged that community pharmacists are the most accessible healthcare professionals to the general public [5]. Studies have shown that community pharmacies offer easy and equitable access to healthcare [6, 7] with estimates that, in the UK, 84.90 per cent of the population make at least one visit in the course of a year.

Comment [AT1]: Cite White paper in England.

Community pharmacies, therefore, appear to be uniquely placed to raise awareness of and screen for cancer. Work has shown people present at community pharmacies seeking care for symptoms which could be indicative of early signs of cancer [8], yet, despite this potential, there is no comprehensive review of the role and contribution of community pharmacies in early cancer detection.

¹ EPOC (Effective Practice and Organisation of Care Group), EPHP (Effective Public Health Practice Project), TIDieR (Template for Intervention Description and Replication), Faecal occult blood (FOB), Prostate specific antigen (PSA)

This study aimed to systematically review the literature to identify and assess the current evidence for the role of community pharmacies in delivering early cancer detection initiatives

Methods

Sources

The following electronic databases were searched to identify evidence: MEDLINE (Ovid), EMBASE (Ovid), CINAHL (EbscoHost) and PsycINFO (EbscoHost). The search period was from inception of the databases to February 2015. The terms used in the search strategy were related to cancer, community pharmacy and intervention (Appendix 1). The search strategy was modified when appropriate to suit syntax requirements; no MeSH terms were used. No limit was placed on study type, publication, date and language in the search strategy. The reference lists of the included studies were hand searched to identify relevant studies.

The review was designed and carried out following established guidelines on good conduct and reporting of systematic reviews[9, 10]; the protocol was registered with PROSPERO [11], registration number 2014:CRD42014009092.

Study selection

To be included in the review, studies had to meet the following criteria:

1. Setting: include or take place within a community pharmacy. In this review community pharmacy was defined as pharmacy that is based in the community (not in a hospital, clinic or online) and is accessible to all;
2. Population: the general public accessing a cancer education or screening intervention;
3. Study type: all study types were included;
4. Intervention: patient-focused cancer education and raising awareness over early cancer symptoms, cancer screening and/or detection;
5. Outcomes: study outcomes were conceptualised in accordance with the framework proposed by Hardeman *et al*[12]. This framework contains four categories: determinants of behaviour (e.g. increased patient knowledge), behavioural outcomes (e.g. reducing exposure to cancer risk factors), physiology and biochemical outcomes (identification of patients with pre-malignant disease) and health outcomes (incidence rates of cancer).

~~Any study that was not set in a community pharmacy was excluded from the review (e.g. a pharmacist working in an outpatient clinic).~~ Interventions that solely sought to educate the community pharmacy team about cancer awareness or did not specifically include patients were also excluded. Studies that were reported as abstracts were also excluded from the review.

The initial screening of search titles and abstracts was undertaken by one researcher(LL) with a ten per cent sample checked by a second researcher(AT); any disagreement was discussed and, if agreement could not be reached, consensus was

reached with a third researcher(AH). The full text version of selected studies were independently screened for by two researchers(LL, AT); data extraction was done independently by two researchers (LL, HN) using a template based on the EPOC data extraction form[13]. Differences in data extraction were resolved through discussion and, if consensus was not reached, the project lead was consulted(AT).

Results

Literature search

In total 2772 articles were identified, 2767 hits were generated through database searches and further five articles were identified through hand search. After duplicates were removed, 2451 studies were screened based on title. Of these, 644 were screened for both title and abstract, which resulted in a full paper screen of 32 articles. In total, ten articles were included in the review (Figure 1).

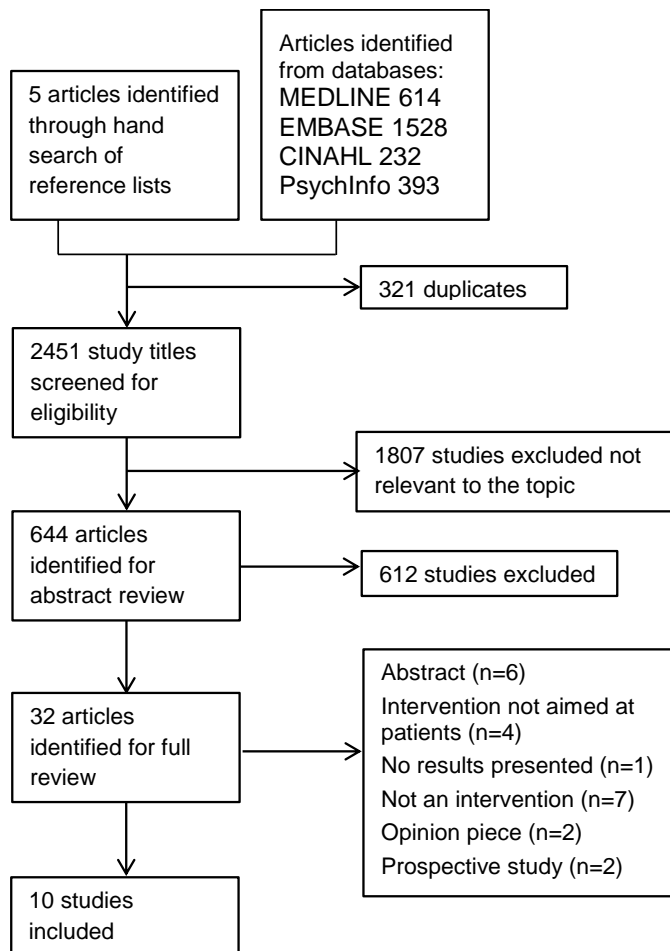


Figure 1: PRISMA diagram showing study selection

Analysis

The studies identified for the review were strongly heterogeneous, thus, it was not feasible to pool results and undertake a meta-analysis. A narrative approach to synthesising the results was adopted. The data used for the synthesis included: type of cancer, study design, population, location, study objectives, outcome measures and outcomes. The categories listed in the TIDieR recommendations for better reporting of interventions, were used to summarise the interventions described in the studies [14].

Quality appraisal

The studies were assessed for quality using the EPHPP Quality Assessment Tool for Quantitative Studies [15] recommended by Cochrane. The global quality scores, based on the individual component scores, divided the studies to strong (n=1) [16], moderate (n=5) [17-21] and weak (n=4) [22-25]. The study components most commonly assessed as weak were confounders and the data collection methodology.

Description of studies

Ten studies were included in the review, these are described in Table 1. The studies were categorised according to the chart of study types for inclusion in EPOC reviews [26]; one was a randomised controlled trial [21], one was a cluster randomised trial [24], one was a non-randomised trial [22] and the remainder were non-comparative studies [16-20, 23, 25].

Study locations were the US (n=5) [17-20, 24], Australia (n=2) [22, 23], Germany (n=1)[16], Italy (n=1)[21] and South Korea(n=1) [25]. The number of participants included in the studies ranged from 91 [23] to 14,041 [21], while the duration including follow up ranged from four weeks [19] to two years [16].

Cancer types

Types of cancer targeted by the studies included colorectal cancer (n=4) [19, 22-24]; colorectal and prostate cancer (n=1) [17]; prostate cancer (n=1) [16]; breast cancer (n=2) [18, 25]; cervical cancer (n=1) [21]; and breast and cervical cancer (n=1) [20, 21].

Participants

The total number of participants in the studies was 25,449, ranging from 91 [23] to 14,041 [21]. Four of the studies were aimed exclusively at women (those for breast and cervical cancer), two at men (those for prostate cancer) and four at both sexes. Three of the studies targeted specific populations: one focused on women living in medically underserved communities [20], one on women who were non-responders to a screening invitation [21], and one on men with untreated or uncontrolled health risks or who were due a physical examination [17].

Study outcomes

The Hardeman causal model was used to categorise the outcomes [12]. All ten studies reported outcome measures relating to the domain of behavioural determinants; increasing awareness and knowledge (n=7) [16-20, 24, 25]; recommending referral (n=3) [21-23]. Outcomes of four studies were identified as influencing patient's behavior [16, 17, 19, 20]. Physiological and biochemical outcomes were measured in four studies (FOB n=2 [19, 24], PSA n=1 [16], Pap/HPV DNA n=1 [21]) and health outcomes (cancer diagnosis) in two [16, 19].

Educational interventions

Four of the studies were aimed at educating the patients [18, 20, 24, 25]. Of these, three were specifically focused on educating women about breast and ovarian cancer. These included a city wide education programme focusing on reducing breast cancer 'myths' [25] and a community intervention to increase the uptake of screening for breast and ovarian cancer in medically underserved areas [20]. Third study provided education and training on breast self-examination (BSE), clinical breast examination (CBE) and mammograms, and provided risk assessment screening [18]. The fourth

study, on colorectal cancer, compared the outcomes between providing patients educational handouts and advice or giving patients FOB test kits [24].

Screening interventions

Eight of the studies undertook screening [16-19, 21-24]. Four of the studies used test kits, of which, two were FOB tests [19, 24], one was a PSA blood test [16] and one used Pap and HPV DNA tests [21]. Three of these studies were large scale screening programmes (n=2,119 [16], n=7,794 [19], n=14,041 [21]) and one was a smaller pilot (n=133) [24].

Four studies provided screening through questionnaires or checklists [17, 22-24]. All the screening tools were previously validated or were constructed from previously validated instruments. The Patient Consultation Questionnaire (PSQ) [27], for identifying patients at risk of colorectal cancer, was used by two of the studies [22, 23], while a Breast Cancer Risk Assessment Tool (Gail model) [28] was used in one study. Another study combined a number of existing tools, including assessments for prostate cancer [29] and colorectal cancer [30], to form a Men's Health Risk Assessment Tool (MHRAT) [17]; however, this tool was not checked for validity or reliability.

Three studies identified patients at increased risk of various developing cancers [17, 18, 23]. The study utilising the MHRAT assessed 40 per cent of participants to be at risk of developing prostate cancer and 24 per cent at risk of colon cancer [17]. Similarly, a breast cancer education and screening intervention found 15 per cent of the participants to be at increased risk of developing breast cancer [18], whilst a screening study for bowel cancer found that 8.7 per cent of those presenting at community pharmacies with bowel symptoms were high risk [23].

Two studies identified the percentage of people attending a follow up appointment after receiving an initial positive screening test result (23.4% for PSA test [16], 59% for FOB test [19]). For the studies using screening tools, the percentage of participants who acted on the recommendation of a referral ranged from 8.8 per cent [23] to 48.7 per cent [17].

Cancer detection

A study using a FOB test for colorectal cancer reported one abnormal test result; no further details on diagnosis was given [24]. The cervical screening RCT compared posting self-sampling tests to non-responders and making the tests available through community pharmacies with the standard practice of a reminder letter; however, the test results were presented together for both of the experimental conditions, therefore it is not known how many of the test kits distributed through pharmacies had a positive test result [21]. Two other studies followed patients throughout the screening process to confirm or exclude a cancer diagnosis. In a prostate screening study, involving all 28 pharmacies in the city, 15 per cent of the PSA test results were positive (PSA >4.0ng/ml) [16] and prostate carcinoma was confirmed in 14 cases, corresponding to an incidence rate of 650 cases per 100,000 men tested. In a colorectal cancer screening, of the 1337 participants assessed as high risk, 23 (2%) were diagnosed with colorectal cancer, of which 20 were early stage [19].

Discussion

This review presents the available evidence on using community pharmacies as a setting to deliver early cancer detection interventions through screening and education. The review shows, it is possible to recruit patients to such interventions

through a community pharmacies, and to identify patients who are at an increased risk of developing cancer. These findings are timely, as recent draft NICE guidance acknowledges thousands of people die every year because of a late cancer diagnosis and thus recommends more people should be referred for cancer testing[31]. Our results suggest that community pharmacies could make a significant contribution to this activity. The potential for increasing community pharmacy involvement in this area has been noted by an early detection collaboration (the ACE programme), which seeks to increase the evidence base around the best practice in early detection, and one of the activity clusters specifically focuses on pharmacy-led initiatives[32].

Due to the heterogeneity of the study outcomes, performing a meta-analysis was not possible; we were limited to reporting our findings as a narrative synthesis and acknowledge this as a limitation of our review. Also, as we restricted our review to interventional studies, qualitative studies examining participants' views on using community pharmacies for such interventions, were excluded. Clearly, for patients to engage in early cancer detection interventions within community pharmacy settings, it is important that they are perceived as worthwhile, appropriate and valuable. However, even though the selection criteria for the review were specifically for interventional studies, some of the studies did include a qualitative aspect and indicated a positive perceptiongood reception of the amongst the participants towards community pharmacy based interventions. One study surveyed participants' perceptions as part evaluating the screening intervention, finding that the participants were enthusiastic about receiving colorectal cancer education and screening from community pharmacists, as they felt that pharmacies were a trustworthy source of information[24]. Another study reported increased confidence levels amongst participants in their ability to perform a breast self-examination following the

pharmacy intervention[18]. Furthermore, previous qualitative work has shown that, in the context of wider public health initiatives, patients view community pharmacists as appropriate providers of such services and, of those that accessed such services, satisfaction levels were found to be high[33].

In the light of the demand to increase community pharmacy involvement in the delivery of wider public health services[6, 34-37], there is a growing body of literature in this area. Indeed a relatively recent systematic review[38] exploring the role of community pharmacies in screening for major diseases concluded it is feasible to screen patients in this setting, but more studies were needed to ascertain the effectiveness and economic benefit of such interventions; of note, this work only identified three studies that were included in our review. Nonetheless, our study supports this work, and shows that the community pharmacy is a feasible setting to deliver screening and educational interventions in relation to the early detection of cancer.

Comment [AT2]: Laura: move this section to just before conclusion.

Given the easy and equitable access of community pharmacies, it is possible that delivering early cancer interventions from community pharmacies could also potentially have an impact on health inequalities, with a recent study showing access to community pharmacies is greatest in areas of high deprivation – the so-called *positive pharmacy care law* [6]. Indeed, given the evidence that supports an inverse correlation between socioeconomic status and incidence and mortality of some cancers, cancer-related inequalities represent a significant challenge for current healthcare systems. Generally, the studies identified in our review were aimed at the general public rather than specifically targeting patients from deprived communities; the socioeconomic status of patients' accessing the interventions were not reported among the studies. One small-scale study did, however, focus on low and moderate

income women living in a medically underserved area and showed that community pharmacies could be used to identify patients at risk of breast and cervical cancer, and to refer them on for further investigation [20]. It is not clear if, or how, this study impacted on health inequalities or if this kind of intervention could be applied to initiatives for other cancers.

Even though the outcomes of the interventions were encouraging, not enough details were given, to get a comprehensive understanding of the interventions that would allow for replication. In general, the practical elements of the interventions were poorly reported, especially in the areas of the delivery, education and fidelity. This lack of detail highlights the need for checklists, such as the TIDieR guide, developed by Hoffman and colleagues, to enable detailed reporting of interventions[14]. Assessing the interventions against the TIDieR categories, it was apparent that the mode of delivery, tailoring and details of modifications were not reported; information about the provider, including expertise, background and training were also limited. The quality and depth of reporting within the included studies is, at present, insufficient to enable others to effectively design and reproduce the interventions, which possibly has implications for the commissioning of future services in this area.

None of the studies explicitly indicated a theoretical framework underpinning the design or delivery of the intervention. This is not to say that the interventions were developed without thought, previous work in the area guided the development of the chosen approach. As many of the interventions were pilots, the focus was on the specific cancers and how screening and education had been undertaken in the past. However, taking the theoretical aspect into account when planning interventions,

would enable greater interplay between practice and theoretical evidence and the advancement of both through the recognition of their interdependent nature [39].

Beyond improving the reporting of interventions, there should also be more focus on capturing the impact of the studies in terms of actual benefit to patients. On the whole, the included studies did not follow the participant through their care pathway and ascertain if a cancer diagnosis was made, and if it was made, the time taken to reach a diagnosis or how the intervention impacted on overall patient survival was not ascertained. We do, however, acknowledge that several of the studies included within the review were not designed to follow up patients in terms of diagnosis or cancer-related morbidity. Furthermore, it is also not understood whether interventions delivered through community pharmacies target a different patient group than what is currently being reached through other providers. In view of these limitations, further work in this area, exploring how such interventions affect the time taken to reach a cancer diagnosis or patient survival are warranted.

Conclusion

There is scope to use community pharmacies as a setting to deliver education and screening early cancer detection interventions. Current evidence shows it is feasible to recruit patients in this setting, but more studies are warranted to demonstrate how these interventions impact on the time taken to reach a cancer diagnosis and patient outcome in comparison to other providers.

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This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. Conflicts of interest: none.

Appendix 1: An example search strategy used in the Medline Ovid platform

1. Cancer
2. Oncology
3. (1 OR 2).ti,ab.
4. Symptom
5. Warning sign*
6. Risk factor*
7. Detect*
8. Awareness
9. Screen*
10. Intervene*
11. Diagnos*
12. Health promotion
13. Prevent*
14. (4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10 OR 11 OR 12 OR 13).ti,ab.
15. Community pharmac*
16. Pharmacy
17. Community pharmacy service*
18. Pharmacist*
19. Pharmaceutical service*
20. Pharmacy assistant*
21. Pharmacy technician*
22. Medicine assistant*
23. Counter assistant*
24. (15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23).ti,ab.
25. 3 AND 14 AND 24

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Study/ location	Objective	Intervention	Population	Setting	Outcome
Berg <i>et al.</i> (2001) Germany	Assess feasibility of the prostate specific antigen (PSA) test strip in the framework of programme for prostate cancer check-ups and see if the acceptance rates could be improved	<p>Materials: PSA test strip for EDTA whole blood and capillary blood, questionnaire, advertisements in media</p> <p>Cancer Type: Prostate</p> <p>Procedures: The test was offered free of charge to all men in Jena. An extensive information campaign accompanied the screening programme. Participants were also asked to fill in a questionnaire. Test results, their meaning and limitations, were given both orally and in writing. Participants with positive results were urged to see the study urologist/GP.</p>	n=2119 men (13% of all potential participants), aged 45-75 years	<p>Provider: All pharmacies (n=28) in Jena. No details given on who administered the tests</p> <p>Duration: One month</p>	<p>Measure: Number of tests conducted and acceptance toward them</p> <p>Result: 2119 tests were completed. Mean number of tests per pharmacy was 83. Fifteen percent of the tests conducted showed a positive PSA results and prostate carcinoma was confirmed in 14 cases (0.66%). Incidence rate responds to 650 cases per 100,000 men tested. Within eight weeks after the pilot ended, 23.4% of those tested positive had consulted an urologist. Of the 14 cases, nine were early stage (T2) and five were clinical stage (T3). The test enhanced acceptance rate of prostate cancer check-ups but should not be used as a substitute for regular physical examinations.</p>
Boyle <i>et al.</i> (2004) USA	Determine whether pharmacists using a risk assessment tool could positively influence men's attendance in annual physical examinations	<p>Materials: MHRAT screening tool</p> <p>Cancer Type: Prostate & colon</p> <p>Procedures: Participants completed the screening questionnaire in pharmacy/at home. Pharmacist discussed the results with the participant in a private appointment. Participants were randomly assigned to control and telephone intervention groups. The intervention included four follow up phone calls by the pharmacist and the control group received a phone call at eight weeks.</p>	n=382 men aged 25-74 years considered at risk or who had not recently had a physical examinations	<p>Provider: 30 pharmacies (urban/rural) selected from applicants replying to the National Community Pharmacist Association (NCPA) adverts. Inclusion criteria was availability of private counselling areas and willingness to complete 15h training at own expense</p> <p>Duration: Maximum of 12 weeks for each participant</p>	<p>Measure: Number of risk factors identified and whether patient attended a physical examination</p> <p>Result: Participants were identified to be at risk for 1194 significant health conditions. The average number of health risks was 3.1. Overall 40% were at risk for prostate cancer, 24% for colon cancer and 68% had not received a physical examination for a more than a year. Pharmacist recommendation encouraged 60% of the men (n=186) to seek an appointment with their physician. There was no difference between the intervention and control group.</p>
Giles <i>et al.</i> (2001) USA	Examine whether education programme about breast cancer screening together with breast cancer risk assessment provided by	<p>Materials: Risk assessment instrument (the Gail model)</p> <p>Cancer Type: Breast</p> <p>Procedures: Participants were recruited from pharmacies and</p>	n=188 women aged 18 and above	<p>Provider: Community pharmacies (n=6) and health screening events (n=2)</p> <p>Duration: Follow up six months after screening</p>	<p>Measure: Confidence in performing BSE, frequency of performing BSE or attending mammogram/CBE</p> <p>Result: Of the participants, 15% were considered to be at high risk of breast cancer. Adherence to ASC guidelines for monthly BSE increased from 31% to</p>

	community pharmacies increases women's confidence in performing screening practices endorsed by the American Cancer Society (ACS)	health screening events during the national breast cancer awareness month. Each participant completed the risk assessment instrument, had consultation with a pharmacist and received written explanation of individual risk factors. All women, regardless of their risk category, were encouraged by the pharmacist to follow guidelines for breast self-examination (BSE) and clinical breast examinations (CBE). Each consenting participant was followed up six months after screening.			56% (p<0.001) for all women six months after the programme. Initially 31% performed monthly BSE which rose to 56% post intervention. For those considered high risk the mean number of BSEs performed increased from 20% to 60% (p<0.005). The mean number of BSEs increased from 2.69 to 4.09 (p<0.001). However, 46.7% of women did not change the BSE frequency post intervention but many of those who did not change frequently were already performing monthly BSE. Women's confidence improved from 6.41 to 7.04 (p<0.001). The risk assessment and education session by pharmacist did not increase the rate of mammogram screening for women over 40.
Giorgio Rossi <i>et al.</i> (2015) Italy	Evaluate the effect of introducing self-sampling device (mail/pharmacy) on screening uptake in comparison to standard reminder letter	Materials: Self-sampling device (Delphi Screener) Cancer Type: Cervical Procedures: The participants were allocated to either control group (standard reminder) or experimental groups (home kit or kit available from pharmacy) through randomised invitation letters. These were sent according to each programmes reminder schedule, usually 3 months after the initial invitation. Tests completed within 3 months of the invitation were counted as a success.	n=14041 women aged 30-64 who had not responded to an earlier invitation to screening	Provider: Six different regional cervical screening programmes were involved. Total of 35 pharmacies were involved across the regions (varying from 1 to 21 per region) Duration: Recruitment 6 months, follow up 15 months	Measure: Participation in screening Result: Participation to screening was 11.9% in the control, 21.6% in home test kit group and 12.0% in pharmacy pick up group. Home mailing sampler kit was an effective way to increase screening participation, effectiveness of pharmacies varied from centre to centre. The cervical intraepithelial neoplasia grade 2+ (CIN2+) detection rate was low in women tested with self-sampling
Jiwa <i>et al.</i> (2009) Australia	Test the two interventions for identifying people at risk of bowel cancer and compare referral rates	Materials: Tick test (based on two referral guidelines), a GP referral letter, Patient Consultation Questionnaire (PSQ) Cancer Type: Bowel Procedures: Pharmacy users presenting with lower bowel symptoms or requesting a product that could be used for such conditions were recruited. Based on	n=109 (59 tick test, 50 QCP)	Provider: 16 pharmacies (tick test n=8, PCQ n=16) in metropolitan Perth. Duration: 8 weeks for the tick test, month for PCQ plus follow up after four weeks	Measure: Number of people referred to GP Result: Tick test: 6 out of 59 were referred to their GP and all of these saw their GP PCQ: 12 participants were referred to their GP. At follow up seven had seen their GP, three were not planning to do so and two could not be contacted

		pharmacy they visited, they completed either the tick test or PCQ. Participants scoring above threshold on tick test were encouraged to see their GP and given referral letter. PCQ scores were given to the participant and sent to their nominated GP. Those with persistent symptoms or score above threshold were encouraged to see their GP.			
Jiwa <i>et al.</i> (2011) Australia	To test the deployment of self-administered questionnaire as an aid to advising patients with lower bowel symptoms	<p>Materials: Patient Consultation Questionnaire (PCQ)</p> <p>Cancer Type: Bowel</p> <p>Procedures: People presenting with symptoms/purchasing a product that could be used for such conditions were consented by the pharmacists and given questionnaires to fill in. Researcher contacted the participants a week later about their scores. Participants' GPs were sent a letter with the score. Patients were contacted four weeks later if they had seen a GP.</p>	n=91(61 female, 31 male ²) aged 18-85	<p>Provider: 21 pharmacies</p> <p>Duration: 6 months</p>	<p>Measure: PSQ score and number of people who acted on referral recommendation</p> <p>Result: 8 out of 91 (8.7%) were recommended to contact their GP as they got a score higher than 50 on the PCQ and out of those 5 did. Majority of people presenting at pharmacies had low PCQ scores. The percentage of people scoring 50 or higher is lower in pharmacies (8.7%) than in GP practices (49.9%). No data on what the outcome of the visit to the GP was.</p>
Levin <i>et al.</i> (1997) USA	Evaluate the three different tests and assess participant and physician compliance	<p>Materials: Non-hydrated Hemoccult, rehydrated Hemoccult and Hemoccult SENSE test kits (containing contained printed instructions with dietary restrictions, collection papers, applicator sticks, free post envelope and 9 FOBTs, 3 of each), questionnaire on risk factors</p> <p>Cancer Type: Colorectal</p> <p>Procedures: Mass media campaign on early detection of colorectal</p>	n=7794 (m=3376, f=4418), 78% aged over 50	<p>Provider: Community pharmacies and community groups in rural area. Staff was trained on giving instructions.</p> <p>Duration: 4 weeks</p>	<p>Measure: Number of kits returned, predictive rates of the different test kits and cancer incidence</p> <p>Result: 13 % of the 85 931 kits distributed were returned for processing. Overall 16% positivity rate was reported. Positivity rates for different tests were: rehydrated hemoccult (15%), hemoccult SENSE (7%), nonhydrated hemoccult (5%). The positive predictive value was 14% for nonhydrated hemoccult, 7% for rehydrated hemoccult and 11% for hemoccult SENSE.</p> <p>Information on diagnostic follow up was obtained</p>

² 61+31=92 not 91

		cancer was run before and during the screening campaign. Distribution sites were showing a video explaining the steps in performing the test followed by verbal instructions by staff. Trained laboratory staff developed the tests. Participants were notified of their results either by phone or letter. Those with positive results were called and received a letter. Permission was asked for contacting their GP about the date and type of follow up performed.			for 943 (70%) of the 1337 participants who tested positive. Of those tested positive 59% had a colonoscopy or flexible sigmoidoscopy and double contrast barium enema examination on follow-up. 23 participants (2%) were diagnosed as having colorectal cancer. Of those diagnosed 20 (87%) were detected at an early stage.
McGuire <i>et al.</i> (2007) USA	Project utilising community pharmacists to educate and enrol low to moderate income and medically underserved women into a state-wide breast and cervical cancer screening programme	Materials: Enrolment packs Cancer Type: Breast and cervical cancer Procedures: Each participating pharmacy was given patient enrolment packs. After enrolment patients received a coupon from pharmacy or from Nebraska Department of Health (if pharmacy was not doing on site enrolment). Coupon entitled them to physical examination including breast and pelvic examination and pap smear).	n=112 women (107 white, Hispanic 3, African-American 2), median age 48, 44% referrals were for women 50 years of age or older	Provider: 28 pharmacies in medically underserved areas Duration: Unclear	Measure: Uptake of referrals from community pharmacies to screening Result: 112 of the 300 packs distributed to patients led to a referral to a doctor. Pharmacists' gender or on-site enrolment of patients did not have major effects on enrolment rate. Sites involved in teaching pharmacy students and sites who advertised the programme in local newspapers were moderately more successful in recruiting women to the programme. All of the 112 referrals came from independent pharmacies. Only two of the referrals came from urban pharmacies.
Park <i>et al.</i> (2011) South Korea	Identify and address barriers to breast cancer screening	Materials: Posters Cancer Type: Breast Procedures: Multicomponent intervention in which one component was posters in pharmacies	n=480 ³ women aged 30-69	Provider: Multiple including pharmacies Duration: 6 months	Measure: Percentage change in those who believed in myths and likelihood of attending mammography Result: Posters at pharmacies and clinics were associated with reduced 'big breast means cancer myth'. Street promotion and pharmacy/clinic posters associated with reduction in the myth that best time to have mammogram is when you have symptoms. Posters in waiting rooms significantly

³ Pre and post intervention groups were independent of each other

					associated with increased intention of having a mammogram.
Potter <i>et al.</i> (2010) USA	Compare the effectiveness of two different pharmacy based colorectal cancer screening interventions	<p>Materials: FOB test (FIT group), 2 page educational hand out (CRCS education group), 16-item survey</p> <p>Cancer Type: Colorectal</p> <p>Procedures: Participants were recruited during influenza vaccination sessions.</p> <p>FIT group: participants received a FOB test with a brief counselling on how to use the test and importance of screening. The researcher contacted the participant and their clinician with the test results.</p> <p>CRCS education group: participants were given the hand out with verbal explanation and were encouraged to contact their GP for a test kit.</p> <p>A reminder call was made to both three to six weeks later. Survey was conducted three to six months later.</p>	n=133 age 50-80	<p>Provider: 18 pharmacies</p> <p>Duration: 2 months during annual influenza vaccination campaign.</p>	<p>Measure: Self-reported CRCS activity, comparison of CRCS completion rates for the two groups</p> <p>Result: 967 people received influenza vaccines during the study times. A total of 133 individuals were enrolled to the study. The follow up rates were 90% for FIT group (n=86) and 74% CRCS education group (n=28).</p> <p>CRCS group: 67.9% had seen their primary care provider by the time of the interview, 50% talked specifically about CRCS with their primary care person and third had scheduled a test or had already completed it.</p> <p>FIT group: 32.6% had seen primary care clinicians and 19.8% had discussed CRCS with their clinician. 59.3% (n=51) reported completing CRCS by any method at the follow up point, the percentage of completed FIT results confirmed to the researchers through results was 52.2%. There was one abnormal result recorded and that participant reported completing diagnostic colonoscopy within two months of receiving the screening results.</p>